A-670

CLINTON LABORATORIES
CENTRAL FILES NUMBER 44-5-360 File Waste Disposal

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Central File 1596

Date 5/23/44

Subject WASTE DISPOSAL FROM SITE X

By Leverett

To Hamilton

#209

Those Eligible To Read the Attached

Copy 2 of 7. ~~A. Kay, Vaughan, W. J. Smith~~
(1) ~~Vaughan~~ FBV
(2) Smith
(3) Kay

Before reading this document, sign and date below

Name	Date	Name	Date
Leverett	5/26		
W. J. Smith	5/27		
H. C. Kay	6/2		

[redacted]

2 7 copies, Series A

Copies to:
1 - Hamilton
2 - Kay, Vaughan, W. Q. Smith
3 - Dean
4 - Apple
5 - Leverett
6 - Reading File
7 - Central File

May 23, 1944

Dr. J. C. Hamilton
Crocker Radiation Laboratory
University of California
Berkeley, California

Dear Dr. Hamilton

WASTE DISPOSAL FROM SITE X

In accordance with our arrangement made during your visit here approximately two weeks ago, I am setting down herewith the state of the waste disposal problem as it is now seen.

Shortly after your departure, we recommended to Mr. Kay that two basins made of earth and holding respectively about 1,000,000 gallons and 300,000 gallons be constructed in the area south of the two cooling ponds. Construction based on this recommendation has started although there has been some modification of the original suggestion and there now will be only one basin having a capacity of 1.6 million gallons. Presumably this will be ready some time in July.

Meanwhile, certain tests are being carried out in the laboratory. We find that dilution of the supernate from the underground waste storage tanks in the ratio of 1 to 35 with plant cooling water produces a precipitate and that, after settling, this precipitate carries down all but about 10% of the beta activity originally in the active waste. The cooling water contains amounts of suspended silt which vary from day to day, but we find that this variation does not influence the final concentration of activity in the supernate, but that more rapid settling and carry-down of activity are achieved when the water is relatively turbid than when it is clear. The degree of turbidity depends on local weather conditions.

The activity contained in the supernate from these settling tests will correspond to slightly more than .3 curie/day in the discharge water from the plant if this means alone is used for reducing the radioactivity of the discharged water.

Some percolation tests have been made using samples of soil taken from the area in which the basin is being dug. The rate of percolation of the diluted waste through this soil is approximately 0.07 cm/day for a hydraulic gradient of 1 cm of water per linear cm of soil. This rate is so slow that there seems to be no reason for concern about the possibility that activity will seep through the walls of the basin.

[redacted]

Measurements of the activity in the water which did seep through the bed of earth in the experiments show that the activity was reduced by a factor of about 5, that is, if all the waste were to be so treated, a discharge from the plant would be reduced to approximately 60 mc/day. The quantity of diluted waste which can be thus decontaminated by unit volume of soil is not yet known but is greater than seven volumes of diluted waste per volume of soil.

Precipitation tests in which aluminum, iron and calcium precipitates were made to form the diluted wastes show that only the calcium precipitate affected the decontamination of the supernate very much. I think that these results probably were available at the time of your visit. The analysis on the sludge has been completed and is reported as follows:

	#1	#4
SiO_2	67.4%	81.5%
Fe_2O_3	2.0	1.6
Al_2O_3	12.5	7.2
MgO	2.1	0.9
CaO	3.8	0.7
PO_4^{---}	0.4	---
F	26.0	11.5

#1: Close to Pond
#4: Farther Downstream

Both these pieces of information have been supplied to us by R. S. Apple.

I am sorry to say that we have not yet been able to solve the problem of transportation of the active liquor from here to your laboratory. My impression is that if the samples are sent out, they will have to be sent by truck. This, of course, is a considerable expenditure of effort and I should like to have your comment on the wiseness of such a procedure. We are not at present contemplating that a truck will go to California from here for this purpose unless it should become quite urgent.

We are awaiting receipt of the results of the fission assay and of a statement of the tolerable quantities of the materials found in the water discharged from our plant.

Very truly yours,

M. D. WHITAKER, DIRECTOR
CLINTON LABORATORIES

By_____
M. C. Leverett

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